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## ON AERIAL AND GROUND DISPLAYS OF THE WORLD'S SNIPES

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While reading Leslie M. Tuck's monographic *The Snipes: a study of the genus *Capella** some years ago, I found the chapter titled "Pair-formation and mating behaviour" especially interesting (Tuck 1972:167-179). Every word brought to mind the bewilderment I had felt while watching the courtship flights of Common Snipes (*Capella gallinago*). When, more recently, Betty Cottrille showed me her remarkable photograph of a Common Snipe displaying on the ground near its nest (see colorplate), my interest sharpened, for I had never witnessed any such performance myself. So explicit was the photograph that most of the tail's 16 feathers could easily be counted. The more I looked at that tail the more I wondered about the part it might take in aerial displays.

I first observed breeding Common Snipes in 1922. That spring, while studying the bird-life of Pymatuning Swamp, an extensive boggy woodland in northwestern (Crawford County) Pennsylvania (Sutton 1928), I was surprised to find snipes nesting in a cattail marsh near Hartstown, the village in which I was staying. The Common Snipe of North America was believed in those days to be of a different species from the Common Snipe of Eurasia and was widely known as Wilson's Snipe (A.O.U. 1931:110). On the very first evening of my sojourn (27 April), I heard many snipes "hooting." I had no idea that they were nesting in the area. I assumed that they were courting, that pairs were forming, that presently the whole noisy population would move on to breeding grounds in Canada. The hooting sounded like the rapid beating of wings. At times it was so sudden and loud that it was almost frightening. Since I had heard it many times before

entering the marsh, I knew that my being there had not started it, but when performing birds flew low over me, hooting loudly and shot off skyward at spectacular speed, I could not help feeling that I had been threatened with bodily attack.

Several days before finding a nest, I watched and listened eagerly, for though I had seen much of the Common Snipe before, its courtship behavior was new to me. On 3 May I observed a "new antic," a springing from the ground of a bird that "after a few energetic, direct wingbeats, put his wings high above his body, and describing a graceful arc, dropped toward the ground, his legs trailing, only to rise again to repeat the performance" (Sutton 1923). It did not occur to me that this was a "display." A bird collected just after performing the "new antic" proved to be a male. What I had witnessed has been called the "arched-wing display" of *C. gallinago* (Tuck 1972). According to this author, my description of it was the first to have been published.

Perusal of the literature convinces me that this "arched-wing display" has been witnessed many times in both North America and Eurasia, but it has been variously described and I may never have seen the whole of it. In Witherby et al. (1941), and also in Bannerman (1961), F. M. Ogilvie is credited with having seen a flying bird "sinking gently through air with raised wings and legs extended, as though about to alight, alternating with turning over first on one side then the other and ending with turning on back." Stubbs (1912) saw a performing bird in England "on some six different occasions twist completely over and proceed for some yards with outstretched wings belly uppermost." During my stay at Pymatuning Swamp in 1922 and in Iceland in 1958 (Sutton 1961) I never saw a Common Snipe turning "completely over" in this way.

What I did see, and in both places, was circling aerial display accompanied by fervent "hooting" or "bleating." In Pennsylvania all of the performing was done over cattail (*Typha*) marsh; in Iceland I observed it performed over flat, low-lying (but not marshy) meadow near Reykjavík (Sutton 1961). The display is an important part of courtship and pair formation and possibly of territory defense. "It occurs sporadically at any time of the year, but is most intense and continuous on the breeding grounds. It is mostly a male display, and males can be distinguished at this season by their frayed middle tail-feathers. The females bleat occasionally during early pair formation and usually after the laying of the first and second eggs" (Tuck 1972:167).

For years I have pondered this remarkable hooting or bleating, wondering whether it has ever been explained fully and correctly. Bahr (1907) wrote at length about it, naming several early writers who had expressed

their views about it, and paying special attention to a paper by Meves (1858) (translated from the Swedish by John Wolley) in which he discussed the "neighing sound which accompanies the single Snipe's . . . flight during pairing time . . . ." *C. gallinago* was sometimes called the Single Snipe in those days, presumably to distinguish it from the slightly larger Double Snipe (*C. media*), a species that breeds in Europe and western Asia.

What Meves (1858) had to say was thought provoking. According to him, opinions concerning the Single Snipe's "neighing" were varied: "Bechstein thought that it was produced by means of the beak; Naumann . . . that it originated in powerful strokes of the wings; but since Pralle in Hanover observed that the bird makes heard its well-known song or cry . . . at the same time with the neighing sound, it seemed to be settled that the latter is not produced through the throat. In the mean time, I have remarked with surprise, that the humming sound could never be observed whilst the bird was flying upwards, at which time the tail is closed; but only when it was casting itself downwards in a slanting direction, with the tail strongly spread out."

This paper's illustrations, pen-and-ink pictures that Wolley (1858) had "caused to be drawn" of what he called the "musical feathers of the tail" in six snipe species, are excellent. And entertaining indeed is Wolley's account of the way in which Meves, in "a little room in the middle of Stockholm," blew on these feathers and fixed them "on levers that he might wave them with greater force through the air," thus demonstrating how they produced the "deep bleat" of the male snipe and the "fainter bleat" of the female. As for the extra wide spreading of the outermost feather on each side of the tail, a spreading that has been illustrated by drawings from time to time (but never by photographs), neither Meves nor Wolley had anything to say. This outermost rectrix is slightly narrowed in most Common Snipes of North America and Eurasia, though not in all of them (see Tuck 1972:83, Fig. 24), and what has been written about aerial displays of snipes in general expresses almost universal belief that the narrowing of the one to several outer pairs of rectrices is responsible for the neighing.

Bahr's (1907) lengthy paper stated: (1) that in displaying Common Snipes observed by himself in England, the outermost rectrix on each side was spread so wide that it stood apart from the rest of the rectrices (1907:16, Fig. 3); (2) that the tail muscles of *C. gallinago* make possible this extra wide spreading of the outermost rectrix (1907:20, Fig. 20); and (3) that the two outermost rectrices, one on either side, though believed to be responsible for the neighing, are not by any means as conspicuously narrowed

(1907:18, 22; Figs. 4, 6) as they are in most other snipes, notably the Pintail or Asiatic Snipe (*C. stenura*), a species that breeds in eastern Siberia.

In my opinion, the importance of the narrowness of the outermost rectrix in *C. gallinago* has been overemphasized. In his scholarly paper on the aerodynamics of the Common Snipe's hooting, Carr-Lewty (1943) so stresses the strength, flexibility and narrowness of this outermost rectrix—in contrast to the wideness, weakness and inflexibility of the middle feathers—that I am puzzled by the photograph in Tuck (1972:83) of a 14-feathered tail in which the outermost rectrix on either side is almost, if not fully, as wide as the other 12. This tail is that of an "adult male" bird from Ireland. Might that particular bird have been incapable of hooting because its outermost rectrices were not narrowed? Not so, in my opinion. In my opinion, that bird hooted by fanning wide and depressing its whole tail, perhaps switching all 14 feathers from side-to-side as it went into a "power-dive." The tail of *C. gallinago* must indeed be equipped with powerful muscles, for in ground displays it is spread wide, lifted high and moved from side-to-side in a truly remarkable manner (see Williamson 1950 and colored frontispiece of this paper).

An important fact about the tails of the "true" snipes of the genus *Capella* may well be stated at this point: the number of rectrices in more than one species is remarkably inconstant. In the Forest, Marsh, or Swinhoe's Snipe (*C. megala*) of Asia the rectrices usually number 20, but "occasionally 18, 22, or even 26" (Tuck 1972:89). Of nine specimens examined for me by David M. Niles at the Delaware Museum of Natural History, four (2 males, 2 females) have 18 rectrices each, three (1 male, 2 females) 16 each, and only two (males) 20 each. In the Pintail Snipe the number is usually 26, "but individuals with 24 or even 28 have been recorded" (Tuck 1972:91). The two specimens at the Delaware Museum of Natural History represent the extremes: a male has 24 rectrices, a female, 28. In all "true" snipes, whatever the species, there is a tendency for the outer rectrices to be narrowed, but the tendency is less noticeable in the three geographical races long believed to constitute the species *C. gallinago* than it is in most other species. The breeding of these three races—*delicata* of North America, *faeroensis* of Iceland and the Faeroes, and nominate *gallinago* of continental Eurasia—is restricted to the northern part of the Northern Hemisphere.

Authors seem to agree that in *C. gallinago* vibration of the outer tail feathers—whether these are narrowed or not—is responsible for the hooting. Ludlow (Ludlow and Kinnear 1934), who observed courting Common Snipes in Chinese Turkestan, was so close to performing birds that he

"could see the vibration of the outer tail feathers." Yet Tuck's (1972:171) own words concerning the "somewhat frayed" condition of the "two central feathers" of the tail of a male that he netted in Newfoundland on 17 April 1960, finding that he had banded that very bird "three years previously at the same location," read as if he considered those two feathers themselves to some extent responsible for the bleating.

Be that as it may, there can be little doubt that the narrowed outer rectrices in most species of *Capella* play an important part in producing the sounds that accompany aerial displays. Morphologically, the most bizarre of the world's snipes assuredly is the Pintail Snipe, referred to above, in whose tail the 10 middle feathers are broad while the remaining eight pairs on each side become gradually narrower and stiffer, the outermost being mere spikes about 1 mm wide from base to tip.

The earliest account of this species' courtship may well be that of Popham (1898), who found the bird nesting along the Yenesei River in Siberia. Concerning the aerial part of its display he wrote: "I never heard the Pintailed Snipe utter any call when rising from its nest, but its 'drumming' sounds like bubbling water, while it is continued much longer and is far louder than the drumming of the Common Snipe. The bird works its way to a considerable height and then descends rapidly, 'drumming' as it goes; if close overhead the noise is terrific." Later, Popham (1901) summarized his observations thus: "The drumming of the Pintailed Snipe may best be described as resembling the sound made by unwinding the line from a salmon-reel with rapidly increasing speed."

More recently, Berman and Kuz'min (1965), as quoted by Tuck (1972:57), reported that male Pintail Snipes perform communally in toks, a tok being the aerial equivalent of a lek. Their words were: "Males in flocks of 10 to 15 birds flew impetuously. From time to time, the whole flock suddenly plunged sideways or each bird glided downwards. Maneuvering in a beautiful manner in the direction of the wind, turning from side to side, like large butterflies, the birds plunged more and more vertically, uttering short metallic calls, *tccheka-tccheka-tccheka*. As the speed of the birds increased the cries became increasingly more frequent, until they merged with the fizzing-and-whistling sounds which originated from the cutting of the air by the narrow tail-feathers. This sound became stronger, increasingly higher and longer, and each bird, descending almost to the ground, stopped dropping, soared upwards and caught up with the flock."

In their monumental *Birds of the Soviet Union*, Dement'ev, Gladkov and Spangenberg (1969) do not, surprisingly enough, have anything to say about the Pintail Snipe's communal displays. Basing their words on a

description by Dorogostaiskii, they state that the circling bird produces a sound like *chvin*, slowly repeated at first but gradually becoming "an uninterrupted trill of beautiful metallic sounds" and ending with a "sizzling" *chiz-zh*.

Most snipes currently placed in *Capella* have aerial displays, a notable exception being the Double or Great Snipe, a comparatively slow flying species whose courtship displays are largely, if not wholly, terrestrial and whose white tail corners are conspicuous as the male birds shuffle through the grass of the lek in the half-light (Blair, in Bannerman 1961). The species of *Capella* that do not have boldly white-cornered tails all take to the air when displaying. The aerial performances are accompanied by sounds, but how those who hear can be sure that certain sounds are vocal while others are not is beyond me. I am prepared to believe that some, perhaps all, of the windy, feathery, buzzing, fizzing, whistling, whirring, bleating, winnowing, neighing, or drumming sounds are produced by the whole tail or part of it, or perhaps by the wings and tail, although some of these sounds may be vocal to some extent.

Note that performing Solitary Snipes (*C. solitaria*) observed by Hume in India uttered a "loud, sharp, jerky call," then descended rapidly "with quivering wings and outspread tail, producing a harsh buzzing sound something like, but shriller and louder, than that produced by the Common Snipe" (Hume and Marshall 1881). Presumably that "loud, sharp, jerky call" was vocal, while the "harsh buzzing sound" was made by sudden fanning and depressing of the tail feathers. A much more recent observer, Baker (1929), also seemed to believe that *solitaria* made two different sorts of sound while performing. His words were: "In the breeding season they drum and bleat over their breeding-haunts like the Fantail [a common name, widely used in Asia, for the Common Snipe], being found at this season between 9,000 and 15,000 feet."

According to Dement'ev et al. (1969), who call *C. solitaria* the Hermit Snipe, performing males ascend, "flying smoothly like a bat and describing small circles; then, with wings half-folded and tail spread like a fan, the bird plummets downward. This is accompanied by sharp jarring sound, and as the drop is interrupted by several pauses, so too the sound is not continuous but intermittent. When still high above ground, the bird halts for an instant . . . and emits a loud cry, which may be taken for call of willow ptarmigan [*Lagopus lagopus*]. The sounds may be rendered as 'zhzhzh' . . . (brief pause) 'zhzhzh' . . . (brief pause) . . . 'zhzhzh' (longer pause) . . . 'chok . . . chok . . . chaaa,' the syllables 'chok . . . chok . . .' jerky, repeated in quick succession and 'chaaa' uttered after a brief pause, drawn out and nasal. After this the male again soars upward, again plummets downward, and so on, several times in succession. This mating

activity has much in common with that of Forest Snipe, but Hermit Snipe male [gives] louder calls and flies higher, not descending to treetops." The tail of *C. solitaria* usually has 20 rectrices (sometimes 22 or 24), the 3–6 outer pairs of which are narrowed.

Concerning the aerial displays of the Japanese, Latham's or Australian Snipe (*C. hardwickii*), a species with 18 tail feathers, the outermost three pairs of which are narrowed, Bahr (1907) quotes thus from the notes of a "Mr. Alan Owston, of Yokohama," who had sent him a skin of the species: "They breed on the grassy moorland at the foot of Mt. Fugiyama, at an elevation of 2000–3000 ft. above the sea . . . . When alarmed they fly . . . overhead, circling round generally against the sun, and every now and again they begin to cry 'chip, chip, chip, sheep, cheo, che-cheo,' and then rush downwards at the intruder, beating the air in the descent and making a terrific rushing noise." Owston also sent Baker this extract from T. W. Blakiston's "Birds observed on the southeast coast of Yezo [Hokkaido] in May," an article published in the Japanese journal *Chrysanthemum* for November 1882: "The Australian species act very like the Snipe of North America, by flying round pretty high and making sudden descents almost to the ground, which latter movement is accompanied by a whispering noise."

More recently, Fennell (1953) calls the courtship performance of *C. hardwickii* a "circular flight, some 25 to 30 feet above the ground, accompanied by a rather harsh *zrack, zrack, zrack* note uttered quite regularly and interrupted only by the rapid *gă, gă, gă, gă, gă, gă, gă, gă, gă, gă*, accompanying the frequent power dives. The latter call has a rather weird, feathery quality and increases in both tempo and volume as the bird nears the ground. A halting sort of choke interrupts the series of notes some three or four syllables before the end, adding to the feeling of rush and stumbling haste. None of the performers appeared actually to alight on the ground at the end of this dive but seemed to veer off and rise into the air to continue the circling flight." Here the author calls the *zrack* a "note" and the *gă* both a "call" and a "note," making us suspect that both sounds might be vocal. For me the word "feathery" describes a non-vocal hooting, drumming, or winnowing not unlike that of the Common Snipe, a sound produced by the spread tail. As for the *zrack*, I can only guess that it is wholly vocal. Since *C. hardwickii* winters widely in Australia (Peters 1934), it has from time to time been called the Australian Snipe.

The Forest or Swinhoe's Snipe, found by Gardner (1930) to be the "most abundant" of the snipes "from September to February" in paddy fields in the Philippines, was said by him to make a "whistling or, better, winnowing sound." As observed by Kozlova (1932) on its breeding grounds in northern Mongolia, the species "soars up into the air to an immense

height, uttering sounds something like 'tchiki-tchiki-tchiki'; then it descends again with great rapidity, producing a clear whistling or howling noise. At about 7 A.M. it seems to become tired of its play, and, sitting on some dry trunk of a tree, continues only its 'tchiki-tchiki,' without soaring up into the air." The 'tchiki-tchiki' obviously is vocal and I strongly suspect that the "whistling or howling noise" is non-vocal. A translation in Tuck (1972:55) from Koslov's "Fauna of the USSR" elaborates a bit, explaining that the performing bird "ascends in spirals, closes its wings, spreads its tail and plunges downward, making first a low, then a constantly louder noise as from a rapidly twirling metallic object."

Dement'ev et al. (1969) state that the courting Forest Snipe produces a sound like *chvi* or *chchvi* as it describes "part of a circle" then "half folds its wings behind back and, with a slight loss of height and speed beats its wings and begins flying horizontally. It then begins a sudden drop accompanied by a sharp sound resembling rustling of paper kite." In the Forest Snipe's tail the outermost four or five pairs of rectrices are narrowed (see figure in Tuck 1972:59).

The Wood or Himalayan Snipe (*C. nemoricola*), a somewhat chunky, slow flying species that breeds "in the Himalayas, between 2,000 and 12,000 feet, from northeastern Punjab to the southern Shan States" (Peters 1934); that has been recorded in winter southward to "southern India, southern Assam and Burma" (Peters 1934); that Adams (1858), who called it the Solitary Snipe, considered a bird of "lonely glens . . . where the pine grows tall and dense, and the sun's rays seldom penetrate"; and that Irby (1861) found "in little rushy patches of bog on the sides of the hills, never on streams" in May 1859 at 6000 to 7000 feet in the Province of Kumaon [in the State of Uttar Pradesh in northern India, just west of northern Nepal] is surely among the least migratory of the Northern Hemisphere's snipes. It is "probably a resident bird throughout the lower Himalayas . . . between 6,000 and 2,000 feet" (Baker 1929). According to Ludlow and Kinnear (1937), the many Himalayan Snipes observed "in the hills west of Mago [on accompanying map shown as a district, not a town, in eastern Tibet] in early August" were "flying like Woodcock of an evening, uttering a croaking 'chur, chur' call." I hazard the guess that this 'chur, chur' was a non-vocal sound produced by spreading and depressing the tail. The species has 18 rectrices, the outermost three or more pairs of which are narrowed.

Of the seven species of *Capella* thus far discussed, only *C. gallinago* breeds in both the Old and the New World. The three above-mentioned races of *C. gallinago* are all strongly migratory, moving southward in winter to areas largely south of the breeding grounds (see map in Tuck 1972:107). The species' spread across two large continents throughout an

area cold enough in winter to require extensive migration bespeaks hardihood, aggressiveness and reproductive potential unique within the genus. Tuck (1972:9-10 et seq.) obviously believes that these attributes have led the species to establish breeding populations also in southern parts of the world, a concept that I find acceptable not only because the southern forms are much like the three northern ones morphologically—though in all of them, without exception, the outermost rectrices are more conspicuously narrowed than they are in *delicata*, *faeroensis* and nominate *gallinago*—but also because the aerial part of their courtship behavior is much the same.

Tuck was not, of course, the first ornithologist to believe that some of these southern snipes might be subspecies of *gallinago*. Seebohm (1886), whose paper on “the species of the genus *Scolopax*” dealt chiefly with morphology rather than behavior, long ago had this to say: “The last half-dozen [southern] species or subspecies . . . can scarcely be regarded as more than tropical forms of the Common Snipe. They vary very slightly in colour or pattern of colour, the variations between the species being scarcely greater than those within each species.”

The five southern snipes that are, in my opinion, races of *C. gallinago* are *paraguaiae*, *magellanica* and *andina* of South America and *nigripennis* and *angolensis* of Africa. Whether all five of these are worthy of recognition is beyond the scope of this paper, for I have made no attempt to borrow series of specimens for comparison, measurement, etc. The five southern races resemble the three northern ones closely in proportions, color and size. Considered together, they and the three northern races form a composite aggregate quite different from any of the six other northern species discussed above, and they are sufficiently different from the Madagascar Snipe (*C. macrodactyla*) of Madagascar and Mauritius, and the Páramo Snipe (*C. nobilis*) of the northern Andes to form a discrete conspecies. I confess to being puzzled because breeding of the five southern races is not restricted to high southern latitudes as that of the three northern races is to high northern latitudes. Not one of the southern races is, so far as known, strongly migratory.

Let us see what observers have reported about these southern races of *C. gallinago*. The earliest comment on the courtship of *C. g. paraguaiae* may well be that of Durnford (1877), who, having watched the snipes in northern Argentina, had this to say: “During the spring they go through the same aerial movements as the Common Snipe at home, rising to a great height by a circling motion, and ‘drumming’ whilst descending in a diagonal line.” Following this statement, Durnford asks a pertinent and thought-provoking question: “How is this curious habit to be accounted for in the South American and European forms except by the theory of

inheritance from a common progenitor?" Another early report on *paraguaiæ* is that of Aplin (1894), who became acquainted with the bird in Uruguay. According to him, the form's drumming differed from that "produced by the English Snipe." He called the sound "a long shaking *kurrrrrr* (the sound can be produced to some extent in the back of the human throat); sometimes it varies to a deep low throated *gurr* . . ." Hudson, in his "Birds of La Plata" (1921), tells us that performing birds "produced singular grinding and scythe-whetting sounds . . . in their violent descent from a great height." In my opinion, the words "grinding" and "scythe-whetting" both aim at describing non-vocal sounds.

Wetmore (1926), discussing a "mating display" observed by him in Entre Rios, northern Argentina on 9 October 1920, wrote that the birds "flew swiftly 12 or 15 meters above the ground and suddenly extended the wings stiffly in a V-shaped angle above the back and fell laterally through the air for a considerable distance." How this graphic description of the "arched-wing display" takes me back to the hours I had with the snipes in northwestern Pennsylvania in the spring of 1922!

Pinto (1935), describing the behavior of *paraguaiæ* observed by him in Bahia, eastern Brazil, says: "On moonlit nights it is wont to entertain itself making swift parabolas in space, when one hears a characteristic guttural noise that is responsible for the dismal name *Rasga-mortalha* [Death-rattle] by which it is known in some areas." A much more recent observer, Barlow (1967), who witnessed the "typical aerial courtship flights . . . each night and on overcast days" between 29 April and 13 May [1963] in Uruguay, called the sound that accompanied flights "winnowing."

Helmut Sick (in litt.), writing of *paraguaiæ* observed on the snipe's breeding ground in Brazil, says that the displaying bird "makes a strong noise that reminds one of the bleating of a she-goat." The performance consists of phrases that ascend in pitch, each lasting 1 or 2 sec. The sound is produced by a "channeled current of air . . . conducted by the wings to the tail, which functions as a 'musical instrument'" (see Welty 1975:211). At the height of the breeding season, Sick tells us, male birds call *ke-ke-ke* or *pi-kjér*, *pi-kjér*, not from the air but from the ground.

On the courtship of *C. g. magellanica*, a subspecies that is "partially resident" in continental South America "from Chile . . . and Argentina . . . south to Tierra del Fuego" (Peters 1934); that Reynolds (1935) found "common enough" on Guffen, an islet just north of False Cape Horn; and that Woods (1975) found "fairly common" on the Falkland Islands, little has been published. Cawkell and Hamilton (1961), writing of birds heard on the Falklands, report: "The drumming note, made in flight, is decidedly musical and is produced only at dusk or in the night." According to Tuck (1972:53), a Reynolds manuscript comments "that sportsmen who are familiar with both *gallinago* of England and *magellanica* cannot differen-

tiate between the bleating of the two." Woods (1975) states that Falkland Islands birds in "nocturnal display-flight" circle high in the air "producing a musical bleating sound with the spread rigid outer tail feathers."

The small subspecies *C. g. andina*, which presumably is largely resident in bogs of the high Andes of southern Peru, western Bolivia, northern Chile and northwestern Argentina (Meyer de Schauensee 1970), is considered a full species by some taxonomists. Nothing seems to have been published about its courtship behavior. Judging from what has appeared in print about its ecology and distribution, I suspect that it is locally sympatric with the Páramo Snipe along the southernmost edge of the range of that much larger and perhaps more slender species. About the Páramo Snipe itself, more later.

Concerning the subspecies *C. g. nigripennis*, a bird long known as the African or Ethiopian Snipe, whose "drumming or bleating noise" is "much the same" as that of the Common Snipe in Europe (Mackworth-Praed and Grant 1952), and whose Mallophaga are "identical" with those of the European form (Meinertzhagen 1952), Thomas Ayers (*in* Gurney 1868) had this to say of courting birds observed in Natal, South Africa: "At this season the cock birds are a great deal on the wing—evidently wooing. They fly about like so many Swallows—rising in the air, and descending with a rapid sweep and beat of the wings to within a few feet of the ground, then rising again and repeating the movement, at the same time making a curious, loud, vibratory, rushing noise, which I once heard as late as midnight on a still moonlight night. The cock birds on the ground almost incessantly utter a loud 'chuck, chuck.' " Gurney (1864) himself said that the flight of *nigripennis* was "precisely like that of the common English Snipe."

Cheesman and Sclater (1935), having observed the courtship of *nigripennis* in northwestern Ethiopia, report: "The drumming cruise takes place not more than 30 feet in the air in circles of 300 yards in diameter. As they fly they fall and make a whirring noise, repeated six times. The fall takes them almost to the ground; then they rise again and repeat the performance. The note produced does not seem as high pitched as that of the English Snipe, and does not resemble a bleating goat, but rather the wing-beat of a swan flying in the distance, but more rapid." According to Bresford (1947), who found the snipes on "sand-bank" islands in Lake Bangweulu in northern Rhodesia, their "drumming" was heard . . . in July.

I suspect that the "chuck, chuck" reported by Ayers (*in* Gurney 1868) was vocal and that the "curious, loud, vibratory noise" was that of the flying bird's tail spread to its fullest and pushed downward. In view of what has been reported about the Double Snipe's use of its white tail-corners in terrestrial display (Bannerman 1961), I was prepared to find

that *nigripennis*, with its largely white outermost rectrices, would also be content with displaying on the ground—not so, apparently.

Concerning the race *C. g. angolensis*, a very long-billed form said to breed from “Angola to Ngamiland and Northern Rhodesia, east to Ndola” (White 1945), I have no comment, since I do not know what its range is now known to be. Some of what is quoted above may have to do with *angolensis* rather than *nigripennis*.

So much, then, for the species *C. gallinago*, the one snipe of the world that breeds in both the Northern and Southern hemispheres, and for six of its congeners that breed only in the Northern Hemisphere. The congeners that breed wholly or largely in the Southern Hemisphere include the Madagascar Snipe, already mentioned, a large, slow-flying form endemic to Madagascar and Mauritius, and a remarkable congeries of South American forms ranging in size from that of the fairly large Páramo Snipe, above mentioned, through that of the slightly larger Imperial, Banded, or Bogotá Snipe (*C. imperialis*), which is known from only two or three localities in the mountains of Colombia and Peru, and through that of the still larger Andean Snipe (*C. jamesoni*) and Cordilleran Snipe (*C. stricklandii*), respectively of the northern and southern Andes, to that of the strikingly big Giant Snipe (*C. undulata*) of the northern part of the continent. *C. jamesoni* and *C. stricklandii* may be conspecific: they resemble each other in many ways and are nowhere sympatric (see Meyer de Schauensee 1970). My calling *C. nobilis* the Páramo Snipe, rather than the Noble Snipe, follows Phelps and Phelps (1958), who gave it the Spanish common name Becasina Paramera. Páramo Snipe is a meaningful name, whereas Noble Snipe is not.

To be noted is the fact that while the above-named Southern Hemisphere forms vary greatly in size, no species in that part of the world has rectrices by any means as highly specialized as those of the Pintail Snipe. Taxonomically, the most puzzling of the Southern Hemisphere forms are *C. macrodactyla* and *C. nobilis*, species which are so much alike that one early systematist considered them conspecific despite their being a continent removed from each other (Seeböhm 1886). Admittedly it is difficult to see why, if the process of evolution eventuates in two races of *C. gallinago* in continental Africa, it should not also eventuate in a third one in Madagascar; but *macrodactyla* is not only proportionately longer-billed and longer-legged than *gallinago*, it is different in behavior. From November 1942–April 1944, van Someren (1947) saw much of *macrodactyla* in the mountains near Fianarantsoa, Madagascar. He considered its flight “quite unlike the sharp zigzagging of the European Snipe.” On 23 November he flushed a parent bird from a small chick whose “clambering and

running through the long grass" was "unlike the cryptic behaviour of the chicks of the Common Snipe."

I find no comparable statements about the behavior of the Páramo Snipe, a bird that may, for all that is now known, be sympatric with *C. g. andina* in the northwesternmost part of that bird's range. Assuredly no specimens indicating even the slightest intergradation between the two forms have been reported.

Certain basic attributes common to the habitats of *macrodactyla* and *nobilis*—chilly nights at the high bogs, food hard to reach in the deep mud—evidently have continued for so long to favor the survival of heavier, longer-billed, longer-legged individuals that both forms have come to be much tougher than Common Snipes, this despite obvious similarities in colors and patterns of plumage. The fact that the two resemble each other superficially suggests that evolutionary forces have operated in much the same way in two far-apart yet ecologically congruous areas. One can but wonder what the precise habitat-differences may be between *C. nobilis* and *C. g. andina* in the montane area throughout which their ranges abut or overlap; the latter is such a little bird in comparison!

The "nuptial flight song" of the Madagascar Snipe, as heard on 9 September 1930, at Doany, Madagascar, by Rand (1934), was "similar to that of *Capella delicata* [*Capella gallinago delicata* of this paper]"—a comment that seems to argue for calling *macrodactyla* a race of *gallinago*. But if, as Rand states, the native names of the bird, Hárakáraka and Ráva rára, are indeed "imitations of the flight song," I cannot help feeling that the sounds most often accompanying aerial courtship must differ radically from the Common Snipe's *hu-hu-hu-hu-hu* that I have heard so many times. Rand (1934) may have erred in supposing that the native names imitated the flight song. According to Harting (1882), the name used by natives at Fianarantsoa was *kekekeka* (presumably in imitation of a call given from the ground), the name *rava-rava* being used not for any "true" snipe, but for the Painted Snipe (*Rostratula benghalensis*). As for the spelling *rava-rava*, rather than *ráva rára*, see Newton (1865).

Almost nothing has been published on the behavior of the Páramo Snipe, a species found by Moore (1934) to be "the most conspicuous bird" in a valley at 11,000 feet in the vicinity of Mt. Sangay in the Ecuadorean Andes. Moore's statement that "at sundown" the snipes' "ecstatic forms whirled overhead to the accompaniment of strange sounds that reminded one of a deep-pitched policeman's rattle" may not pertain at all to the Páramo Snipe, for an elderly Indian of Moore's party insisted that the sound was made by a much larger bird, the sympatric Andean Snipe. Whether what Moore heard was Páramo Snipes or Andean Snipes (or both!), the sound

could not have been much like that of courting *C. gallinago*. According to Harry Lumsden, who heard the Páramo Snipe's "bleating" in Colombia, the sound was "very low and deep in tone" (Tuck 1972:57).

The Strickland's or Cordilleran Snipe (*C. stricklandii*), as observed by Reynolds (1935) on six of the Wallaston Islands at South America's southernmost tip between 11 and 22 December 1922, was "heard continuously throughout the night . . . when the wind was not roaring." On Herschel Island, while one bird was "drumming" overhead, another bird, thought to be the female, "kept up a continuous 'chip-chip-chip' etc. from the ground." This same "chip-chip-chip" was "uttered frequently in flight," followed by drumming of such exceedingly low pitch as almost to reach "the lowest limit of human audibility." A loud *cha- wheu* or *cha- whoo*, *cha- whoo*, *cha- whoo* repeated a number of times was distinctly audible when the drumming could "no longer be picked up." How Reynolds (1935) knew that the drumming was continuing when he could no longer hear it is not clear to me. In my opinion, the *cha- whoo* was produced by the outspread tail, which has 14 feathers, none of them noticeably narrowed or stiffened (see figure in Tuck 1972:71).

The Andean or Jameson's Snipe (*C. jamesoni*) of the northern Andes, as observed by Vuilleumier (1969) in "wooded thickets and grassy openings at altitudes from 3,300 to 3,400 m." in the Bolivian Andes, gave a double note, a *whee-tschwu*, "repeated at a frequency of about two per second, while the calling bird flies in wide circles on a level course." After calling constantly for 30 sec to a full minute, the circling bird began to descend, slowly at first, but gaining speed. As it neared the ground a "muffled, low-pitched sound which vaguely reminds one of a cow's bellow" became audible. Vuilleumier (1969) presumed that this low-pitched sound was "produced by the vibration of feathers, and not vocally, although neither tail nor wing feathers show obvious modifications." To be noted is the significant fact that the second syllable of this *whee-tschu* of *jamesoni* rhymes with the *cha- whoo* of *stricklandii* (see paragraph above). The tail of *jamesoni* also has 14 feathers, the outermost three pairs of which are somewhat narrowed in a specimen from Colombia (USNM 386788) at hand. If the outermost rectrices are narrowed in most *jamesoni* but not in most *stricklandii* the difference would, in my opinion, argue for calling the two forms separate species.

The aerial displays of the little known Imperial Snipe (*C. imperialis*), as witnessed in July 1968 "just below the timberline at 3,300 m (10,000 feet)" in the "vast and largely unexplored northern massif of the Cordillera Vilcabamba" of central Peru, were "of equal intensity at dawn and dusk," reaching "peak intensity" in clear weather, "heavy cover almost entirely squelching the usual performance." The display flight was accompanied

by a "song" that began "with a series of rough staccato notes that rapidly increase in volume. A climactic middle section is marked by a complex rhythmic pattern of double and triple notes. After a final triple burst, the song enters a terminal phase in which the sound intensity diminishes in a sequence of evenly spaced notes" (Terborgh and Weske 1972). These authors obviously believed this "song" to be wholly vocal. According to them, the "first two-thirds" of it, "comprising the crescendo and climactic phases, are given in level flight powered by rapid shallow beats of the stiffly held wings. A gently sloping dive commences with the terminal sequence of single notes. An instant after the last note of the vocalization the bird pulls sharply out of the dive, producing a rush of air through the remiges (?) that is clearly audible at close range."

The "rush of air" might, in my opinion, have been through the widespread and depressed tail feathers, an opinion based on my belief that in most species of *Capella* the rectrices are used in this way. Terborgh and Weske (1972) consider the aerial display of *imperialis* similar "in several respects" to that of *jamesoni* (see quoted material above); they say nothing about the courtship of the big snipe of the southern Andes as such, for they consider *jamesoni* a geographical race of *stricklandii*. Concerning *imperialis* and "*C. stricklandii jamesoni*" they have this to say: "Both species display after sundown well into darkness and call repeatedly while flying in wide nearly level circles"; vocalizations of *jamesoni* "are apparently given continuously for several circuits," while those of *imperialis* "are more complex and divided into discrete episodes. Both species produce a low whirring sound while descending, presumably by allowing air to pass through the remiges in a certain way"—*imperialis* "at the end of each song bout," *jamesoni* "at the termination of a 30- to 60-second display period as it spirals back to earth."

I cannot dismiss from discussion these three large, somewhat stocky South American snipes—*imperialis*, *jamesoni*, and *stricklandii*—without mentioning the fact that Peters (1934) placed them in the genus *Chubbia*, a taxon erected by Mathews (1913). Insofar as their courtship behavior is concerned, there seems to be some justification for considering *Chubbia* a valid genus. The three species resemble woodcocks of the genera *Scolopax* and *Philohela* in being proportionately shorter-tailed and shorter-winged than the several other snipes discussed in this paper.

Now for the dramatically big Giant Snipe (*C. undulata*), a bird whose habits have been virtually unreported. The species' disproportionately short tail has 14 feathers, the outermost two or three pairs of which are somewhat, though not noticeably, narrowed (see figure in Tuck 1972). Helmut Sick (in litt.), writing of the bird's behavior as observed by him in Brazil, tells us that it is "by nature lazy"; that, rather than flushing, it

"squats or escapes by walking slowly, taking long steps"; that it is "even more nocturnal" than its sympatric congener, *C. g. paraguayiae*; and that it does most of its performing on "hot rainy nights." In courtship displays "high above its territory" it produces a sound that resembles the phrase hó-go, go or gá-ga, ga, loud at the beginning, but trailing off at the end, and with a timbre so much like that of the human voice that one cannot help feeling that it is vocal. The sound, whether vocal or not, is responsible for the vernacular names Água-só, O-razap and Rola-pau. In addition to this trisyllabic phrase, the bird produces a "strong droning *sch* that lasts four seconds, a sound that might be compared to . . . the buzzing of a large swarm of bees." The general appearance of this very large snipe certainly calls woodcocks to mind. In the one specimen of the species at hand, the rectrices are hard to count for they are hidden by the long and abundant coverts.

The little Jack Snipe (*Lymnocryptes minimus*) of Eurasia is sometimes placed in *Capella* (Edwards 1974), but it is so unlike the several other snipes already discussed that it may well belong in a genus by itself. It is famous for the "cantering" sounds that it makes while courting. It has only 12 tail feathers, all soft and somewhat pointed, none noticeably narrowed. The "cantering," which has been transliterated as "lock-toggi, lock-toggi" and "clockety-clockey, clockety-clock" by Blair (*in* Bannerman 1961), and which must be vocal since it is given from the ground as well as from the air, is not, apparently, analogous to the bleating, hooting, or drumming of *C. gallinago* and most of that bird's congeners.

According to Blair (*in* Bannerman 1961), the Jack Snipe was once known in parts of its extensive range as the Silent Snipe, for it was believed to be voiceless during fall and winter, but "in the breeding season, though difficult as ever to flush," it made its presence known "by what must rank as one of the most peculiar notes uttered by a bird"—notes that take on "a liquid quality, bearing some resemblance to the bubbling of a spring, or even to the boiling of a kettle." Such Jack Snipe courtship noises as are comparable to the bleating of the Common Snipe, are, according to Blair, made as the flying bird "glides down on outstretched wings, its quills meanwhile producing a whirring sound reminiscent of the drumming of its ally." I feel sure that the word "quills," as used here, refers to wing quills, not tail quills. Unlike most of the snipes discussed in this paper, the Jack Snipe does not use its tail at all in producing a sound while in courtship display.

Finally, a word about the Common Snipe picture that set me to writing this paper (see colorplate). The photograph was taken on 21 May 1967, near Jackson, Jackson Co., southern Michigan, by Betty Darling Cottrille. It shows a bird with lifted, widespread tail displaying at the nest. The

fluffy coverts look like under tail coverts, but they are upper coverts. After holding the tail in this position for a second or so, the snipe turned it so that the under side, with the coverts, faced the camera.

Betty Cottrille and her husband, Dr. W. Powell Cottrille, have been enthusiastic observers of birds for a long time. The Common Snipe has nested regularly in a marshy area not far from their home in Jackson. For 14 successive seasons, beginning in 1952, the Cottrilles paid special attention to that species. Nest after nest that they found held a full clutch of four eggs. What they wanted was a nest ready for eggs or with an incomplete clutch so that they could observe the birds' behavior during the incubation period. By 1967 their search had become almost an obsession.

Let me now quote from Betty Cottrille (in litt.) herself: "That year [1967] a pair with early nest weathered the vicissitudes of cold, rain, and finally, on 23 April, a three-inch snowfall. Hatching began late in the day on 13 May. Next morning, which was overcast and chilly, we found one egg in the nest and three chicks dispersed in the grass with their parents. Meanwhile, we had discovered another nest, this with one egg on 4 May and four eggs on 7 May. Having learned from Bent's [1942: 86] classic work that incubation would last 18–20 days, we made plans."

"On 21 May, the 15th day of incubation, the weather was perfect for photography. My husband and I, he with a movie camera, I with a 'still,' spent 1 ¾ hours in the blind that morning, hoping that the bird on the nest would exhibit some variation in behavior now that the end of the incubation period was at hand. The blind was about ten feet from the nest. Our cameras were poised. The incubating bird, obviously at ease while we waited, took several short naps, with bill-tip resting on the ground."

"What a surprise was in store for us! When the bird decided to leave the nest it stood up, took a few steps away from the eggs, leaned forward, and displayed. The display involved, first, spreading and lifting the tail until it stood straight up, then slowly, not jerkily, turning the perfect fan until, with upper side and coverts facing the camera, its plane paralleled that of the body's main longitudinal axis. Nor was this all. Having held the bizarre position for a second or two, the tail swung back to 'normal,' then turned once more—through an arc of 90 degrees—this time presenting its under side and coverts to the cameras. We were indeed fortunate: my husband's movies, as well as my stills, recorded what we had witnessed."

"On the 19th day of incubation (25 May) luck was with us again, but of a different sort. The weather was just right. When we visited the nest early that morning it contained four chicks, two of them dry, the other two still wet, with their shells nearby. The parents were beside themselves

with excitement. Within minutes we had set up the blind and focussed cameras, anticipating a repeat of that spectacular display. No such luck this time, for the emphasis had shifted to caring for the chicks. One parent darted in and out of the grass, which was now tall, clucking and dropping its wings, occasionally running to the brood and covering them hurriedly. As the two youngest dried and fluffed out, the chicks became more active. Now the parents, hidden in the grass, seemed to increase their coaxing. One by one the chicks tottered and stumbled to them. Out of sight—the excitement over! Nothing remained, except the flattened grass where the blind had been, to bear witness to that unforgettable drama. How the pictures would remind us of the wonderful antics we had witnessed so many times spring after spring!”

#### SUMMARY

All but one of the 13 currently recognized species of the scolopacid genus *Capella* display in the air during courtship, though aerial display is not restricted to the breeding season. Display flights are accompanied by hooting, bleating, neighing, or whinnying sounds that are widely believed to be nonvocal and that almost certainly are produced by vibration of some or all of the tail feathers. Drawings showing extra-wide spreading of the narrowed outermost feather on each side of the tail in *C. gallinago gallinago* have led to the belief that that feather is responsible for the sound; but investigation reveals the fact that this feather is not by any means always much narrowed in the Northern Hemisphere's three races of *C. gallinago*; that in the several Southern Hemisphere races of *C. gallinago* 2 or 3 pairs of outer rectrices are narrowed; that in several other species of *Capella*, notably *C. stenura*, one to several outermost pairs of rectrices are narrowed; and that in ground displays of *C. gallinago* in various parts of that species' very wide range the movements of the tail reveal such great maneuverability as to suggest that the hooting or neighing is produced by the pressing downward or from side to side of the whole tail. Courtship flights of the Giant Snipe (*C. undulata*), hitherto unreported, are like those of smaller snipes in some ways but are accompanied by trisyllabic sounds that are probably vocal. The courtship of *C. gallinago andina*, a form that inhabits the Andes, apparently has not been described. The Double Snipe (*C. media*), whose outer rectrices are largely white, displays on the ground rather than in the air. The Jack Snipe (*Lymnocyptes minimus*), a small species placed by some taxonomists in *Capella*, makes strange “cantering” sounds during courtship, but since these are given from the ground as well as from the air they are presumably vocal.

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## COLORPLATE

The colorplate Frontispiece of the Common Snipe (*Capella gallinago*) has been made possible by an endowment established by George Miksch Sutton.

## ANNUAL MEETING—THE WILSON ORNITHOLOGICAL SOCIETY, 1982

The 63rd annual meeting of The Wilson Ornithological Society will be held at Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 6–9 May, 1982. In addition to the scientific program, there will be an art exhibition and a program for spouses. Daily fieldtrips are planned for the Blacksburg area. On the morning of 9 May, there will be a fieldtrip to Mountain Lake, Virginia, elev. 4000+ feet, one hour distant from Blacksburg to see northern (boreal) breeding birds.

Chairman of the Local Committee is Dr. Curtis Adkisson, Dept. Biology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061. Information concerning accommodation, transportation and related matters will be mailed to the Society membership. Chairman of the Program Committee is Dr. Clait Braun, Wildlife Research Center, 317 W. Prospect St., Fort Collins, Colorado 80526. Abstracts of papers to be given in the scientific sessions must be received by him before 1 April 1982.